REMARKS

The Examiner rejected Claims 1-14 and 21-31 under 35 U.S.C. 102(e) as being anticipated by Dunsmore (US 6,643,597). Applicant traverses the rejection.

Applicant submits that the teachings of Dunsmore of interest in this rejection are directed towards optimizing models of a set of calibration standards and a test fixture, using a process in which the standards are connected to a test system by the test fixture, and the standards and the test fixture have one or more parameters that are initially unknown or poorly known. The optimized models are used to create a calibration array which can be used to calibrate the test system by compensating for errors introduced by the test fixture. The only relevance of Dunsmore to the use of different test fixtures is the fact that the method taught can be applied to different test fixtures independently once the calibration standards have been molded. There is no teaching in Dunsmore of comparing two different test fixtures.

Applicant submits that the current invention, as claimed in base Claims 1 and 26, is directed towards first creating a port-specific **difference array**, which describes a difference **between** two different test fixtures at their corresponding test ports; then using a test system to measure the performance of a DUT mounted in one of the two test fixtures; and finally applying the port-specific difference array to transform the measurements to approximate the DUT performance that **would** have been measured by that test system if the DUT had been mounted in the other of the two test fixtures prior to testing.

The current invention does not attempt to compensate for the errors introduced by either test fixture, but simply relates the hypothetical performance that would be measured for a DUT in a first test fixture, to the actual measured performance of that same DUT in a second test fixture. The first fixture may, for example, be a relatively costly and bulky fixture used in a quality control laboratory environment, while the second fixture may be some relatively inexpensive and compact fixture used on a manufacturing production line. Another possibility is that the first fixture may be a fixture which was once used extensively but has since become inconvenient or relatively unavailable. In this case, the second fixture may be

its current replacement, but there may remain a need to refer current measurements of a DUT back to hypothetical measurements that could have been made of that DUT if the first fixture were still in use so that a database created by using the first fixture can be used.

Applicant draws the Examiner's attention to the fact that the current invention does not involve model optimization, and does not require even incomplete models of test fixtures or calibration standards. However, the invention is fundamentally concerned with the relationship between the effects of one test fixture on measurements made by a given test system to the effects of the other test fixture on measurements made by that test system.

Claims 1 and 26 require a port-specific difference array, the difference array describing a difference between a first test fixture and a second test fixture at a corresponding test port of the test fixtures. The Examiner points to Dunsmore (col. 13, lines 5-20; col. 14, lines 47-67 and col. 15, lines 1-13) as teaching this limitation, identifying element 140 of Figure 1 as the "the port-specific difference array that is created to record the difference between the test fixture (item 430A, Fig. 5) and a standard (item 420, Fig. 5)".

Applicant submits that the cited passages do not teach the Claim limitations. Figure 1 of Dunsmore and the cited passages simply teach that element 140 is a "calibration array" that is created using the test fixture and models for the standards after the models have been optimized by the earlier steps of calibration method 100. Applicant submits that the cited passages do not teach either that 140 is a port-specific difference array, or that the differences in question are the differences between first and second text fixtures at a corresponding test port of the test fixture.

First, regarding the requirement that the array is a difference array, Applicant submits that the teaching in Dunsmore regarding differences (for example in column 13, lines 52-67, and in Claim 12) concerns the use of differences between simulation and measured values in determining the minimization metrics used to optimize the models,. These differences are used to adjust the element values in the models, and are not themselves incorporated into the models. Applicant submits that the Examiner has not pointed to any teaching that these differences appear as elements of array 140.

Second, even if calibration array 140 taught by Dunsmore were taken to represent differences of some kind, the Examiner states that the differences would be those between test fixture 430A and standard 420, but the Claim requires differences between two test fixtures. Hence, the Examiner must be assigning the calibration standard 420 as the second test fixture. Dunsmore teaches in Figure 5 and the related passage (col. 18, lines 21-31) that 420 is a set of calibration standards, such as, for example, a short, an open, a load, and a thru (SOLT). Dunsmore also teaches that a test fixture is an element that provides an electrical and mechanical interface (col. 7, lines 12-26) either **between the test system and the calibration standards** (Figure 5 and col. 18, lines 58-61) or **between the test system and the DUT** (Figure 5 and col. 18, lines 32-42). Hence, the standards identified by the Examiner could not be a second test fixture, since the standards are not used to connected the DUT to the test system. Moreover, the Claims require that the DUT is measured when mounted in the second test fixture. There is no teaching in Dunsmore that the DUT is even mounted in the calibration standard, or connected to it during any measurement process. In this regard, it should be noted that the calibration standard is used in place of the DUT during certain calibration operations.

Accordingly, Applicant submits that even if array 420 were to represent differences between calibration standard 420 and test fixture 430A, as suggested by the Examiner, it would not represent differences between two test fixtures, as the Claims require.

Hence, Applicant submits that Dunsmore does not anticipate Claims 1, 26, or the Claims dependent therefrom.

Claim 27, which depends from Claim 26, additionally requires that the port-specific difference array is applied to measurements of the DUT mounted in the second test fixture to transform the measurements into measurements that match the hypothetical measurements of the DUT in the first test fixture. The first set of passages to which the Examiner points, column 7, lines 55-67 and column 8, lines 22-40, discuss a method of calibration using computer models, and considerations in selecting appropriate models. These passages do not disclose the limitation in Claim 27 relating to the application of the difference array to transform measurements made in one fixture to match hypothetical measurement in another test fixture. The Examiner also points to column 12, lines 21-39. Applicant submits that this

passage discusses a calibration method that involves measuring S-parameters of a test fixture and calibration standards, and does not disclose the limitation in Claim 27 relating to the application of the difference array to transform measurements made in **one** fixture to match a hypothetical measurement in **another** test fixture. Hence, Applicant submits that there are additional grounds for allowing Claim 27 and the Claims dependent therefrom.

In rejecting Claims 2-3, 11, and 13, the Examiner points to column 14, lines 61-67, column 15, lines 1-13, column 18, lines 55-67, and column 19, lines 1-10 as teaching that "the determined port-specific difference array is an error adaptor that is applied to the measured performance of the DUT to essentially remove an effect of a port portion of the second test fixture and to add an effect of a corresponding port portion of the first test fixture on the measured performance". First, Applicant submits that the limitation which the Examiner discusses here is relevant only to Claim 2, not Claims 3, 11, and 13. Second, Applicant disagrees with the Examiner's reading of Dunsmore as teaching all the limitations of Claim 2.

First, as discussed above with respect to Claim 1, from which Claim 2 depends, Applicant submits that Dunsmore does not teach the limitation relating to determining a port-specific difference array. Second, Claim 2 additionally requires that array to be applied to the DUT measurements to remove an effect of a port portion of the second test fixture and to add an effect of a corresponding port portion of the first test fixture. Applicant submits that the passages to which the Examiner points, column 14, lines 61-67, column 15, lines 1-13, column 18, lines 55-67, and column 19, lines 1-10, discuss models and their optimization, but do not disclose that any difference array is applied, nor that the calibration that is described therein has the effects regarding port portions of text fixtures that are required by the Claim. Hence, Applicant submits that there are additional grounds for allowing Claim 2.

Claim 3, which depends from Claim 1, additionally requires that characteristics of a set of calibration standards are measured at corresponding ports of the two test fixtures by separately inserting each calibration standard of the set in each test fixture at a respective port; and solving for elements of the difference array using results obtained from measuring characteristics of the calibration standard set for each test fixture. Applicant submits that the passages to which the Examiner points, column 14, lines 61-67, column 15, lines 1-13,

column 18, lines 55-67, and column 19, lines 1-10, discuss models and their optimization, but do not disclose the measurement of calibration standards in the manner specified by this Claim. Hence, Applicant submits that there are additional grounds for allowing Claim 3

Claim 11, which depends from Claim 1 through Claim 3, additionally requires that several equations are solved for several unknowns using the measured results, the solved unknowns representing the difference array elements. The passages to which the Examiner points, column 14, lines 61-67, column 15, lines 1-13, column 18, lines 55-67, and column 19, lines 1-10, discuss models and their optimization, but do not disclose the solving of several equations for several unknowns **representing difference array elements**. Hence, Applicant submits that there are additional grounds for allowing Claim 11.

Claim 13, which depends from Claim 1 through Claim 3, additionally requires that the measuring and solving are repeated for each port or each pair of ports of each of the test fixtures. The passages to which the Examiner points, column 14, lines 61-67, column 15, lines 1-13, column 18, lines 55-67, and column 19, lines 1-10, discuss models and their optimization, but do not disclose the measuring and solving **for each port or each pair of ports of each test fixture**. Hence, Applicant submits that there are additional grounds for allowing Claim 13.

In rejecting Claim 6, which depends from Claim 1, the Examiner points to column 6, lines 48-57 of Dunsmore as providing the additional requirement that a performance of one or both of the test fixtures **and** a performance of one or more calibration standards of the set used in determining the port-specific difference array are unknown or poorly known. Applicant submits that the passage to which the Examiner points discusses the use of calibration standards with unknown or poorly known performance characteristics but does not teach that the performance of any test fixture is unknown or poorly known, as required by the Claim. Hence, Applicant submits that there are additional grounds for allowing Claim 6.

In rejecting Claim 7, which depends from Claim 1, the Examiner points to column 7, lines 33-51 of Dunsmore as teaching the additional requirement that determining a port-specific difference array employs measurements of the test fixtures determined at a plurality of frequencies in a frequency range of interest for the DUT. Applicant submits that the

passage to which the Examiner points merely refers to an operational frequency range of the DUT and states that the calibration method taught by Dunsmore "may include a broader frequency range than the frequency range of interest". Applicant submits that at most Dunsmore teaches that measurements of calibration standards in a given test fixture are made at a plurality of frequencies, used to optimize models of the standards and of that test fixture, and in turn create a calibration array corresponding to that test fixture. Applicant submits that the Examiner has not pointed to any teaching regarding the making of measurements of two test fixtures at a plurality of frequencies **in order to generate the terms of the difference array**, as required by the Claim**.** Hence, Applicant submits that there are additional grounds for allowing Claim 7.

In rejecting Claim 8, which depends from Claims 1 and 3, the Examiner points to column 12, lines 5-21 of Dunsmore as providing the additional required teaching that the set of calibration standards connects corresponding pairs of ports together so that all combinations of ports in each test fixture are separately connected as pairs for measuring the characteristics. Applicant submits that the cited passage at most teaches that one *thru* standard is used to connect one input portion and one output portion of one test fixture. The Examiner has not pointed to any disclosure that all combinations of ports in each test fixture are separately connected as pairs. Hence, Applicant submits that there are additional grounds for allowing Claim 8.

In rejecting Claim 12, which depends from Claims 1 and 3, the Examiner points to col. 8, lines 1-35 as providing the additional required teaching of optimizing a model using the measured results for each test fixture, the model representing one or more of the port-specific difference arrays, wherein optimizing comprises adjusting parameters of the model until a difference between test fixture measurements is minimized, the test fixture measurements being converted measurements of the second test fixture produced by the model using the measured results for the second test fixture and the measured results for the first test fixture, the model parameters representing the elements of the difference array. Applicant submits that the passage cited by the Examiner discusses computer models in a general way, offering no specific teachings regarding ports, difference arrays, optimization, or conversion between the two test fixtures. Hence, Applicant submits that there are additional grounds for allowing Claim 12.

In rejecting Claim 14, which depends from Claim 1 through Claim 3, and Claim 29, which depends from Claim 26, the Examiner points to column 13, lines 51-62 of Dunsmore as providing the additional teaching required by these Claims that solving for elements of the difference arrays comprises determining a complex square root of one of the elements. Applicant submits that the passage in question relates to the use of the "least squares" metric, which is a mathematical technique of finding the "best fit" to a set of data by minimizing the sum of the squares of the differences between the fitted function (or model) and the data. The Claim limitation in question relates to finding a complex square root of one element in a difference array. The two mathematical operations are quite different. Hence, Applicant submits that there are additional grounds for allowing Claims 14 and 29 and the Claims dependent therefrom.

In rejecting Claim 21, the Examiner points to Column 19, lines 16-47 for the required teaching that the computer program comprises instructions that, when executed by the computer, implement determining a port-specific difference array that adjusts for a difference between a first test fixture and a second test fixture when each is used to interface the DUT for measurements. First, Applicant submits that the cited passage discusses programs and models in relation to a test fixture, but does not describe the use of any type of difference array. Second, the cited passage is silent about adjusting for any **difference between two test fixtures**. Hence, Applicant submits that Dunsmore does not anticipate Claim 21 and the Claims dependent therefrom.

Claim 22 depends from Claim 21 and further requires that the difference array is applied to correct or adjust the measured performance of the DUT, such that the DUT performance is measured using the second test fixture approximates a hypothetical DUT performance as if measured using the first test fixture to interface the DUT to the test equipment. The passage cited by the Examiner, Column 19, lines 16-47, discusses programs and models in relation to a test fixture, but does not teach correction or adjusting of the type required by this Claim. Hence, Applicant submits that there are additional grounds for allowing Claim 22 and the Claims dependent therefrom.

Claim 23 depends from Claim 22 and further requires that the difference array is applied directly to the DUT measurements to transform the measured DUT performance into the hypothetical DUT performance. The Examiner points to Column 7, lines 55-67 and Column 8, lines 22-40 of Dunsmore for these teachings. Applicant submits that the cited passages describe model selection in a general way but are silent with respect to the specific transformation required by the limitations of this Claim. Hence, Applicant submits that there are additional grounds for allowing Claim 23.

Claim 24 depends from Claim 22 and further requires that the difference array is applied to a calibration of the test equipment to correct calibration coefficients of the test equipment, such that the measured performance of the DUT is equivalent to the hypothetical DUT performance. As noted above with respect to Claim 23, the passages cited by the Examiner, Column 7, lines 55-67 and Column 8, lines 22-40. describe model selection in a general way but are silent with respect to the specific transformation required by the limitations of this Claim. Hence, Applicant submits that there are additional grounds for allowing Claim 24.

Claim 25 depends from Claim 21 and further requires that the computer program comprises instructions that implement determining a complex square root of an element of the difference array using values of the element at a plurality of frequencies. The Examiner points to Column 13, lines 51-62 of Dunsmore as providing this teaching. As noted above with respect to Claim 14, Applicant submits that the passage in question relates to the use of the "least squares" metric, which is a mathematical technique of finding the "best fit" to a set of data by minimizing the sum of the squares of the differences between the fitted function (or model) and the data. The Claim limitation in question relates to finding a complex square root of one element in a difference array. The two mathematical operations are quite different. Hence, Applicant submits that there are additional grounds for allowing Claim 25.

Respectfully Submitted,

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